Claims

1. A pharmaceutical composition comprising a nucleic acid molecule of the short-chain dehydrogenase (SCAD) gene family or a polypeptide encoded thereby or a fragment or a variant of said nucleic acid molecule or said polypeptide or an effector of a nucleic acid molecule of the SCAD gene family or said polypeptide, e.g. an antibody, an aptamer or another receptor recognizing a nucleic acid molecule of the SCAD gene family or said polypeptide encoded thereby, preferably together with pharmaceutically acceptable carriers, diluents and/or adjuvants.

2. The composition of claim 1, wherein the nucleic acid molecule is a vertebrate or insect SCAD nucleic acid, particularly a nucleic acid encoding a Drosophila protein (GadFly Accession Number CG3842), an unnamed protein (SEQ ID NO: 1 and 2), a human CGI-82 protein (SEQ ID NO: 3 and 4), or or a human PAN2 protein (GenBank Accession Number NP_065956 for the protein, NM_020905 for the cDNA) or a fragment there of or a variant thereof and/or a nucleic acid complementary thereto.

3. The composition of claim 1 or 2, wherein said nucleic acid molecule
   (a) hybridizes at 50°C in a solution containing 1 x SSC and 0.1% SDS to a nucleic acid molecule as defined in claim 2 and/or a nucleic acid molecule which is complementary thereto;
   (b) it is degenerate with respect to the nucleic acid molecule of (a)
   (c) encodes a polypeptide which is at least 85%, preferably at least 90%, more preferably at least 95%, more preferably at least 98% and up to 99,6% identical to a SCAD polypeptide as defined in claim 2;

(d) differs from the nucleic acid molecule of (a) to (c) by mutation and wherein said mutation causes an alteration, deletion, duplication or premature stop in the encoded polypeptide.

4. The composition of any one of claims 1-3, wherein the nucleic acid molecule is a DNA molecule, particularly a cDNA or a genomic DNA.

5. The composition of any one of claims 1-4, wherein said nucleic acid encodes a polypeptide contributing to regulating the energy homeostasis and/or the metabolism of triglycerides.

6. The composition of any one of claims 1-5, wherein said nucleic acid molecule is a recombinant nucleic acid molecule.

7. The composition of any one of claims 1-6, wherein the nucleic acid molecule is a vector, particularly an expression vector.

8. The composition of any one of claims 1-5, wherein the polypeptide is a recombinant polypeptide.

9. The composition of claim 8, wherein said recombinant polypeptide is a fusion polypeptide.

10. The composition of any one of claims 1-7, wherein said nucleic acid molecule is selected from hybridization probes, primers and anti-sense oligonucleotides.

11. The composition of any one of claims 1-10 which is a diagnostic composition.

12. The composition of any one of claims 1-10 which is a therapeutic composition.

13. The composition of any one of claims 1-12 for the manufacture of an agent for detecting and/or verifying, for the treatment, alleviation and/or prevention of an disorders, including metabolic diseases such as obesity and other body-weight regulation disorders as well as related disorders such as metabolic syndrome, eating disorder, cachexia, diabetes mellitus, hypertension, coronary heart disease, hypercholesterolemia, dyslipidemia, osteoarthritis and/or gallstones and others, in cells, cell masses, organs and/or subjects.

14. Use of a nucleic acid molecule of the SCAD gene family or a polypeptide encoded thereby or a fragment or a variant of said nucleic acid molecule or said polypeptide or an effector, e.g. an antibody, an aptamer or another receptor recognizing a nucleic acid molecule of the SCAD gene family or a polypeptide encoded thereby for controlling the function of a gene and/or a gene product which is influenced and/or modified by a SCAD homologous polypeptide.

15. Use of the nucleic acid molecule of the SCAD gene family or a polypeptide encoded thereby or a fragment or a variant of said nucleic acid molecule or said polypeptide or an efector, e.g. an antibody, an aptamer or another receptor recognizing a nucleic acid molecule of the SCAD gene family or a polypeptide encoded thereby for identifying substances capable of interacting with a SCAD homologous polypeptide.

16. A non-human transgenic animal exhibiting a modified expression of a SCAD homologous polypeptide.

17. The animal of claim 16, wherein the expression of the SCAD homologous polypeptide is increased and/or reduced.

18. A recombinant host cell exhibiting a modified expression of a SCAD homologous polypeptide.

19. The cell of claim 18 which is a human cell.

20. A method of identifying a (poly)peptide involved in the regulation of energy homeostasis and/or metabolism of triglycerides in a mammal comprising the steps of

(a) contacting a collection of (poly)peptides with a SCAD homologous polypeptide or a fragment thereof under conditions that allow binding of said (poly)peptides;

(b) removing (poly)peptides which do not bind and

(c) identifying (poly)peptides that bind to said SCAD homologous polypeptide.

21. A method of screening for an agent which modulates the interaction of a SCAD homologous polypeptide with a binding target/agent, comprising the steps of

(a) incubating a mixture comprising

(aa) a SCAD homologous polypeptide, or a fragment thereof;

(ab) a binding target/agent of said SCAD homologous polypeptide or fragment thereof; and

(ac) a candidate agent

under conditions whereby said SCAD polypeptide or fragment thereof specifically binds to said binding target/agent at a reference affinity;

(b) detecting the binding affinity of said SCAD polypeptide or fragment thereof to said binding target to determine an (candidate) agent-biased affinity; and

(c) determining a difference between (candidate) agent-biased affinity and the reference affinity.

22. A method of screening for an agent which modulates the activity of a SCAD homologous polypeptide, comprising the steps of

(a) incubating a mixture comprising

(aa) a SCAD homologous polypeptide or a fragment thereof; and

(ab) a candidate agent

under conditions whereby said SCAD polypeptide fragment thereof has a reference activity;

(b) detecting the activity of said SCAD polypeptide or fragment thereof to determine an (candidate) agent-biased activity; and

(c) determining a difference between (candidat) agent-biased activity and reference activity.

23. A method of producing a composition comprising the (poly)peptide identified by the method of claim 20 or the agent identified by the method of claim 21 or 22 with a pharmaceutically acceptable carrier, diluent and/or adjuvant.

24. The method of claim 23 wherein said composition is a pharmaceutical composition for preventing, alleviating or treating of diseases and disorders, including metabolic diseases such as obesity and other body-weight regulation disorders as well as related disorders such as metabolic syndrome, eating disorder, cachexia, diabetes mellitus, hypertension, coronary heart disease, hypercholesterolemia, dyslipidemia, osteoarthritis and/or gallstones and other diseases and disorders.

25. Use of a (poly)peptide as identified by the method of claim 20 or of an agent as identified by the method of claim 21 or 22 for the preparation of a pharmaceutical composition for the treatment, alleviation and/or prevention of of diseases and disorders, including metabolic diseases such as obesity and other body-weight regulation

disorders as well as related disorders such as metabolic syndrome, eating disorder, cachexia, diabetes mellitus, hypertension, coronary heart disease, hypercholesterolemia, dyslipidemia, osteoarthritis, and/or gallstones and other diseases and disorders.

26. Use of a nucleic acid molecule of the SCAD family or of a fragment thereof for the preparation of a non-human animal which over- or under-expresses the CG3842 homologous gene product.

27. Kit comprising at least one of

(a) a SCAD nucleic acid molecule or a fragment thereof;

(b) a vector comprising the nucleic acid of (a);

(c) a host cell comprising the nucleic acid of (a) or the vector of (b);

(d) a polypeptide encoded by the nucleic acid of (a);

(e) a fusion polypeptide encoded by the nucleic acid of (a);

(f) an antibody, an aptamer or another receptor against the nucleic acid of (a) or the polypeptide of (d) or (e) and

(g) an anti-sense oligonucleotide of the nucleic acid of (a).